Methods for Development of Habitat Data: Forest and Range 2002 Assessment

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Fire and Resource Assessment Program
Department of Forestry and Fire Protection
1920 20th Street
Sacramento, CA 95614

Abstract

An accurate depiction of the spatial distribution of habitat types within California is required for a variety of legislative-mandated government functions. The California Department of Forestry and Fire Protection's (CDF) Fire and Resource Assessment Program (FRAP) is mandated to assess the amount, extent, and condition of California's forests and rangelands and identify alternative management and policy guidelines. To conduct the *Forest and Range 2002 Assessment*, FRAP has combined habitat distribution data from numerous sources into a format compatible for use within a Geographic Information System (GIS). The resulting GIS data layer will be combined with additional layers to generate tabular outputs of habitat acres by bioregion, county, and ownership. In addition, the data will support numerous spatial modeling efforts to address timber, range, fire, development impacts, and wildlife habitat issues. A description of the data and methods used to develop them is provided.

Fire and Resources Assessment Program (FRAP) evaluated numerous GIS layers and determined that no single mapping effort provides data adequate to address the broad range of issues covered in the 2002 Assessment. Statewide mapping efforts typically provide insufficient resolution to capture types that occur as “inclusions,” such as, wet meadows, riparian areas, or certain types of development. Other efforts tend to focus on mapping a specific geographic area (bioregion, national park), or theme (wetlands, farmland). Since resources were targeted to a narrow focus, many of these efforts can make a reasonable claim to be the “best” for their respective area or theme. In order to provide the most solid basis for our analyses, FRAP staff made the decision to take advantage of these sources and merge them into a single GIS data layer.

Methodology

Merging data from multiple sources required addressing differences in resolution, currentness, extent, categorical detail, classification system, and consistency. These differences were resolved and a final product created through the following processes:

- data evaluation
- crosswalking/modeling
- common resolution
- data merging
- data review

Data Evaluation

A critical step in merging disparate data is gaining an intimate knowledge of each source. This requires evaluation of a number of unique characteristics.

Resolution: this defines the smallest mapped spatial unit, or minimum mapping unit. Data with the finest resolution tend to capture small inclusions such as meadows, rock outcroppings and lakes.

Currentness: each data source was mapped using imagery, photography, and/or fieldwork from specific dates. Obviously, efforts that are more recent tend to more realistically represent current conditions.

Extent: while several data sources covered the entire state, most had a unique extent, such as hardwood rangelands, counties with farmland, a national park, or riparian corridors. Mapping efforts with a restricted extent tend to focus resources on a narrow target and provide the "best" localized depiction. Statewide or regional efforts provide for consistency across a larger area and are useful for "filling in" areas that are not covered by more localized mapping efforts.

Categorical detail: categorical detail relates to the level of specificity used in classifying features. For example, classifying a single coniferous forest type provides less detail than identifying unique types, such as red fir, redwood, and ponderosa pine. For this example, the extra detail is critical for wildlife habitat evaluation and modeling. In a broader sense, categorical detail relates to additional structural data for tree size, tree canopy, shrub size, and shrub crown decadence.

Classification system: each source used a specific system for classifying types, depending on the intended end use. The finer the level of categorical detail, the more flexibility is provided for cross walking the various systems to CWHR.

Consistency: ideally, each unique mapping effort would apply the same resolution, currentness, categorical detail, and classification system throughout its extent, but this was not always the case. Inconsistencies can lead to misuse of the data. For example, a mapping effort that identifies

pastureland in some counties and not others can mislead users into thinking no pastures exist in a given area.

A summary of the data evaluation process is provided in Table 1. Many data layers were evaluated, however this table only provides details for data that were used in the final product.

Table 1. Results of Data Evaluation Process

No.	Data Theme	Data Source	Scale	Resolution	Source Data	Extent	Categorical Detail Compared to CWHR			Classification System
							Type	Size	Density	
1	Water	USGS 1:100,000 DLG	1:100,000	1 Acre	1998	Statewide	less detailed	none	none	USGS DLG
2	Urban - dense housing	U.S. Census	1:100,000	N/A	1990	Statewide	more detailed	none	none	# of housing units per block group
3	Urban - Commercial development	USGS Land Use/Land Cover (LUDA)	1:250,000	100 acres	1970's	Statewide	more detailed	none	none	Anderson
4	Wetlands/Riparian	DFG/DWR	1:9,600	1.25 Acres	1999	Suisun Marsh	more detailed	none	none	MCV
5	Riparian	CSU Chico	1:12,000	< 1 Acre	2000	Sacramento River	more detailed	none	none	Custom
6	Wetlands/Riparian	NPS	1:24,000	.5 Hectare	1993	Points Reyes, Golden Gate NRA	more detailed	none	none	MCV
7	Wetlands/Riparian	DFG	1:40,000	900 m^2	1993	Central Valley/SF Bay	Less detailed	none	none	Custom
8	Agriculture	DOC FMMP	1:100,000	10 Acres	1998	50 counties	less detailed	none	none	FMMP system
9	Agriculture	DWR Land Use	1:24,000	1 Acre	1994-96	West Fresno and West Stanislaus CO	more detailed	none	none	DWR system, cross-walked by FMMP staff to DOC classes
10	Forest and rangeland	CDF/USFS LCMMP	1:60,000	2.5 Acres	1994-97	52 million acres of forest and rangelands	more detailed	more	more	CALVEG
11	Forest and rangeland	USFS	1:60,000	2.5 Acres	1984	Toiyabe NF	more detailed	more	more	CALVEG
12	Forest and rangeland	NPS	1:125,000	5 acres	1934	Yosemite National Park	more detailed	none	none	Custom
13	Hardwood rangelands	CDF	1:60,000	625 m^2	1990	Statewide hardwood rangelands	less detailed	less	less	CWHR Custom
14	Desert and other lands	GAP - UCSB	1:250,000	100 Hectare	1996	Statewide	same	none	same	CWHR

1. USGS 1:100,000 DLG data modified by Teale data center http://www.usgs.gov/
2. 1990 Census Block data modified by CDF to reflect uninhabited public lands http://www.census.gov/
3. 1970's USGS land use (LUDA): urban areas were extracted using the commercial, transportation and industrial classes. http://www.usgs.gov/
4. Department of Fish and Game (DFG) 1999 wetlands data for Suisun Marsh: used to depict habitat stages for this east bay area wetland. http://www.dfg.ca.gov/whdab/
5. The Sacramento River Riparian Mapping Project, CSU Chico (2000): used to map riparian lands along the Sacramento River and its major tributaries. The study area was confined to streams in the Sacramento Valley and ending in the foothill canyons on both sides of the Valley Contact: Director of Geographical Information Center, California State University, Chico, Chico, CA, 95929-0425, (530) 898-5969, email:cwnelson@csuchico.edu
6. National Park Service, Point Reyes National Seashore (1993): used to depict habitat types for Point Reyes National Seashore, Golden Gate National Recreation Area, Angel Island State Park, Samuel P. Taylor State Park, Mount Tamalpais State Park, and Tomales Bay State Park.
7. 1993 Wetlands and Riparian GIS database, Department of Fish and Game: http://maphost.dfg.ca.gov/wetlands/
8. Department of Conservation (DOC) Farmland Mapping and Monitoring Program (FMMP) (1998): the classes "Prime", "State", and "Unique" were extracted to depict lands currently in agricultural uses. In addition, the "Developed" class was used as an additional source for locating urban lands. http://www.consrv.ca.gov/dlrp/FMMP/index.htm
9. Department of Water Resources land use: 1996 DWR land use data for western Fresno and western Stanislaus counties were cross walked to FMMP classes by DOC staff and used to depict agricultural lands for these two central valley counties. http://wwwdwr.water.ca.gov/
10. California Department of Forestry and Fire Protection /USDA Forest Service CALVEG (1994 - 1997): currently includes all USFS lands, and all non-USFS forest and rangelands except for the South Sierras and Central Coast, most of which will be mapped in 2002 and 2003.
11. Toiyabe National Forest (1984): from CAL/NEV GAP data and Toiyabe National Forest timber stand map.
12. Yosemite National Park (1934):
13. CDF hardwood rangelands (1990): http://frap.cdf.ca.gov/data/hardwood_veg/index.html
14. 1998 GAP analysis project, UC Santa Barbara. Citation: Davis, F. W., D. M. Stoms, A. D. Hollander, K. A. Thomas, P. A. Stine, D. Odion, M. I. Borchert, J. H. Thorne, M. V. Gray, R. E. Walker, K. Warner, and J. Graae. 1998. The California Gap Analysis Project--Final Report. University of California, Santa Barbara, CA. http://www.biogeog.ucsb.edu/projects/gap/gap_rep.html

Some data layers were not evaluated because they would contribute to the product in-directly. Table 2 identifies data layers that were integrated into the Land Cover Mapping and Monitoring Program (LCMMP), a large-area regional mapping program conducted by CDF-FRAP and the USFS-RSL. Products identified in Table 2 were integrated with LCMMP data. Integration of these products at the mapping stage provides data that is more consistent and up to date across a larger area, leveraging locally available data in the cleanest, most effective manner.

Table 2. Data Integrated Into or Used By LCMMP

Data Source	Source Date	Web address
SANDAG	1995	http://www.sandag.cog.ca.us/data_services/
Riverside County	1994	http://www.co.riverside.ca.us/
Orange Co	1993	http://www.oc.ca.gov/
SCAG Land Use	1990/93	http://www.scag.ca.gov/
Santa Monica NRA	1993	http://www.nps.gov/samo
Jackson Demonstration State Forest	1996	http://www.fire.ca.gov/ResourceManagement/jdsf_intro.asp
California Hardwoods	1990	http://frap.cdf.ca.gov/data/hardwood_veg/index.html
Anza Borrego State Park	1998	http://cal-parks.ca.gov/default.asp
AMBAG	1993	http://www.ambag.org/
BLM Susanville District Land Cover Classification	1994	http://www.ca.blm.gov/
Vandenberg AFB Vegetation	1990	http://www.vafb.af.mil/
Hoopa Indian Reservation Vegetation	Not available	Not available
HSU Habitat Classification	1994	http://www.humboldt.edu/
Timberland Task Force	1990	http://frap.cdf.ca.gov/

Cross Walking/Modeling

FRAP cross-walked each data source into a common classification scheme, the California Wildlife Habitat Relationships System (CWHR), before assembling them into a statewide habitat layer. This process reinterprets vegetation type, size and canopy closure labels from the source classification scheme to the CWHR scheme. The CWHR system was developed to logically categorize vegetative complexes and their structural characteristics into classes that are appropriate for predicting wildlife habitat suitability.

Habitat Type:

FRAP assigned CWHR classes based on the dominant vegetation/land cover label identified in the source classification scheme. The wildlife habitat types used in the CWHR system can be found in

Attachment 1.

Habitat Structure-Tree Types:

Table 3 identifies the tree canopy closure classes used in CWHR. Table 1 identifies the tree canopy source information, which was cross-walked to CWHR tree canopy classes. Crosswalks can be viewed on line at *http://frap.cdf.ca.gov/projects/frap_veg/index.html*.

Table 3. CWHR Tree Canopy Closure Classes

Tree Canopy	Description (% Canopy Closure)
S	10 to 24%
P	25 to 39%
M	40 to 59%
D	60 to 100%
	Not Determined

Table 4 outlines the tree size classes used in CWHR. Table 1 identifies the tree size source information, which was cross-walked to CWHR tree size classes. Crosswalks can be viewed on line at *http://frap.cdf.ca.gov/projects/frap_veg/index.html*.

Table 4.CWHR Tree Size Class Descriptions

CWHR Size	Description	Diameter at Breast Height
1	Seedling	Less than 1 inch
2	Sapling	1 to 6 inches
3	Pole	6 to 11 inches
4	Small Tree	11 to 24 inches
5	Medium/Large	Tree Greater Than 24 inches
6	Multi Layered	Size 5 Over Size 4 or 3; Total Tree Crown Closure greater than 60 percent

Due to the absence of structural detail in some of the data sources, the final data product is missing tree size class on 3.8 million acres (12 percent) of forestland and is missing canopy class on 1.8 million acres (6 percent). For forestland, 1.6 million acres (5.1 percent) are missing both size and density.

Habitat Structure-Shrub Types:

Shrub habitat stage measures are based on crown decadence and canopy closure classes. Shrub canopy classes (Table 5) are identical to the tree canopy class measures. CWHR shrub size class descriptions differ from tree size attribute descriptions in that they are measures of age and/or degree of crown decadence. Table 6 outlines the CWHR size class measures used for non-desert shrub types.

Table 5. CWHR Shrub Canopy Class Descriptions

CWHR Shrub Canopy	Description (% Canopy Closure)
S	10 to 24%
P	25 to 39%
M	40 to 59%
D	60 to 100%
	Not Determined

Table 6. CWHR Shrub Size Class Descriptions

WHR Shrub Size Class	Description	WHR Shrub Crown Decadence
1	Seedling Shrub	Seedlings or sprouts < 3 years
2	Young Shrub	None
3	Mature Shrub	1 – 25%
4	Decadent Shrub	> 25%

Since few efforts to map vegetation and habitat in California develop shrub seral stage information, FRAP staff used spatially explicit fire perimeter data to model CWHR habitat stages for shrub-dominated habitats. Shrub seral stage model rules are detailed in Table 7.

Table 7.CWHR Shrub Size/Canopy Model Rules

	Number of Years in Habitat Stage																				
WHR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	>21
ADS	4M																					
LSG	2S						4M															
BBR	2S						4M															
SGB	2S						4M															
MCP	1		3D							4D												
MCH	2S					3D															4D	
CRC	1		3D							4D												
CSC	2S						3D														4D	

Habitat Structure-Herbaceous/Desert Types:

For herbaceous and desert types, data limitations precluded the ability to adequately identify seral stages.

Data Merging

After cross walking, each data source was converted into a raster (GRID) format with 30-meter cells. Typically, this 900 square meter resolution was finer than the original data source.

Decision rules were developed to determine which sources would take precedence during the merge process. For example, a portion of a census block classified as urban might extend into a lake mapped by USGS. The polygon could be labeled as either water or urban, depending on whether USGS hydrography or the census data are given precedence, respectively. It is important to realize that regardless of the decision rules, acreages from the merged data will differ from the original source data. For example, even if USGS hydrography data are given top priority, additional lakes are going to be present from other sources, particularly if they have a finer resolution.

Table 8 lists the data sources in order of decreasing precedence. Data listed first are given precedence (overwrite) data that follow in the list. Not all data layers overlap, and in these cases processing order does not matter. Also, it is important to recognize that some data have a wider extent than others, and therefore tend to have a larger contribution, even if they have a lower precedence. The

"merged geographic extent" describes the actual extent of the data source in the merged product. For example, the statewide GAP data had the lowest precedence, thus its derived extent is restricted to two regions where data are lacking from other sources. Finally, the " percent contribution" column provides the actual percent of statewide coverage the data source provides to the merged product.

Table 8. Order of Precedence for Data Merging

Data source	Merged geographic extent	Percent contribution
USGS 1:100,000 DLG	Statewide water bodies	1%
Census (1990) + LUDA	Statewide developed	3%
DFG/DWR Wetlands/Riparian (1999)	Suisun Marsh	<1%
CSU Chico Riparian (2000)	Sacramento River	<1%
NPS Wetlands/Riparian (1993)	Point Reyes/Golden Gate NRA	<1%
DFG Wetlands/Riparian (1993)	Central Valley/SF Bay	1%
DOC Farmland Mapping Program (1998)	Central Valley	10%
DWR Land Use (1994-1996)	Western Fresno/Western Stanislaus	1%
LCMMP CDF - USFS (1994-1997)	Statewide forest and rangelands, except Southern Sierras, Central Coast	46%
USFS (1984)	Toiyabe NF	3%
NPS (1934)	Yosemite National Park	1%
CDF Hardwood Rangelands (1990)	Central Coast/South Sierra	10%
GAP – UCSB (1996)	Desert/Southeast	25%

After merging the sources into a single data layer, tests revealed that the product was too large to be efficiently utilized for analysis and modeling. FRAP performed tests and verified that the data could be re-sampled to 100 meter cells with minimal impact, even on types that tend to occur as small inclusions. After re-sampling to 100 meters (one hectare minimum mapping unit), the merged product was reduced to a more reasonable size that enhanced performance for analysis and modeling. The 100-meter draft product then was made available for data review.

Data Review

The *Forest and Rangeland Resource Assessment and Policy Act of 1977* requires FRAP to seek public review and comment on how critical data components are constructed. The initial review of the draft data was the first step in an ongoing process to create and eventually improve the data. Additional comments are expected once the data are released and used in the 2002 Assessment.

Initially, the draft product was reviewed internally through a systematic comparison with species range maps from Meyer and Laudenslayer's *A Guide to Wildlife Habitats of California* (1988) and supplemented with Griffin and Critchfield's *The Distribution of Forest Trees in California* (1972). This was useful for identifying CWHR types in the data that extended beyond their natural range. In some cases, adjustments to cross walks were sufficient to correct inconsistencies. Other cases could not be solved through cross walking, and were flagged for further study or future mapping efforts.

FRAP staff also compared the draft product with the Forest Inventory and Analysis (FIA) program data. Direct comparisons with FIA are difficult because statewide ownership data are inadequate. Comparisons on USFS lands show both estimates of "forestland" to be within 5 percent of each other.

Potential problems identified through the internal review process are provided below.

Comment: A "hole" exists in the distribution of Douglas fir, when compared to Griffin and Critchfield. Upon further review, this appears to be an error in the LCMMP species models and should be corrected on the next revisit cycle (2002). The draft product underestimates Douglas-fir acres and overestimates Sierran Mixed Conifer acres in Shasta, Tehama and parts of Plumas and Butte counties.

Comment: CWHR Tree Size class "6" (multi-layered) stands are not well represented in the draft data. Due to the difficulty of mapping multi-layered stands with remote sensing, very few size class 6 stands were mapped in the original data sources. The process used by FRAP allowed for identification of multi-layered stands when the conifer component is the over-story and hardwood is the under-story. It was not possible to use the same procedure to identify multi-layer coniferous stands.

Comment: The process of merging multiple data layers into a statewide data set resulted in some seam lines (discrepancies) along the boundaries of various mapping products. This occurs when coarse scale products meet fine scale products, when classification schemes don't allow for good crosswalks or when there have been differences in interpretation of vegetation communities. FRAP found and fixed major seam lines; however, many still exist.

Comment: Agriculture acres differ from those published in the Department of Conservation Farmland Mapping Program (FMMP). CDF only selected FMMP classes "Prime," "State," "Unique," and "Developed" for inclusion in this analysis. CDF excluded the "Locally important" class because it was not consistently applied across the state. In addition, agriculture from several other data sources contributes to the statewide product. Finally, non-agricultural areas from data sources with a higher precedence (lakes, urban, riparian) overwrite some areas mapped by FMMP as agriculture.

Comment: Pasturelands, which are an important component of the rangeland economy, are not well represented in the final data product. Pasture was not consistently mapped within the data sources, and should be an area of future emphasis for mapping efforts.

For external review, acreage tables were sent to over 200 reviewers, and an interactive map (ArcIMS) was created for on-line viewing of the draft product. The review team included experts and interested parties from UC, CSU, UC Extension, federal and state agencies, counties, private consultants, CDF field staff, and providers of source data.

Many respondents felt the habitat estimates were reasonable. Others identified potential problems that should be addressed. Many of these problems are in areas where the LCMMP has yet to complete its

first round of mapping, and should be corrected over time. In the short-term, our only course of action is to document these areas of concern as a warning to the data user, and to ensure problems are corrected in future mapping efforts.

External comments are summarized below.

Comment: FRAP was unable to locate all sources that could have improved the statewide product. FRAP made a reasonable effort to locate existing local data sources; however, not all data were identified. In particular, data from Tuolumne, San Bernardino, and Monterey counties were not located in time to be incorporated into the initial product. In addition, some data sources were identified but not used in the product. Data for the Mojave Desert, Yosemite National Park, and Sequoia/Kings Canyon National Parks were not completed in time for inclusion in this product. These sources will contribute to this product in the future, either as direct inputs or as inputs into LCMMP data. Various other data sources were evaluated but for various reasons not incorporated into this effort.

Comment: The use of census data to represent developed areas may over-estimate the extent of development. The census data represent the most consistent statewide product available for identifying dense housing development. Comparisons made in western San Diego County show that the draft product overestimates the urban class by five percent when compared to local land cover data (SANDAG).

Comment: The draft product included the Blue Oak Foothill Pine type between the Kings River and the White River in Tulare County, where in reality foothill pines are conspicuously absent from this stretch of the Sierra Foothills. The source data for this area were CDF Hardwoods Rangeland data (1990), and the problem will be corrected when the area is mapped by LCMMP in 2002.

Comment: Types that occur as "inclusions" on National Forest lands may be under-represented in the draft product National Forests, other than the Toiyabe, are mapped by the LCMMP. It is difficult to use one number to characterize the accuracy of vegetation data over such a diverse area; however, accuracy assessment results from LCMMP indicate hardwood "life forms" are accurate approximately 80 percent of the time. Still, difficulties in mapping types that tend to occur as inclusions or "stringers," such as, hardwoods, riparian areas or wet meadows were a deciding factor in merging in various sources of riparian and wetlands data into the final product. None of the riparian/wetland mapping efforts covered a significant amount of National Forest land. Currently, the LCMMP is working with numerous state and federal cooperators to assess the possibility of refining mapping methods to include a better accounting of riparian areas and wetlands.

Comment: There is potential confusion between Eastside Pine (EPN) and Jeffery Pine (JPN) in Inyo and Mono counties. These areas will be reviewed in the next map update cycle for better representation.

Comment: There is an absence of Annual and Perennial Grass lands in Inyo County. These areas will be reviewed in the next map update cycle for better representation.

Comment: The Yosemite data is too old (1934) for inclusion in this product. The alternative for this area is GAP data, which has a much coarser resolution. Local Park staff expressed confidence in the 1934 data for type mapping, despite its age.

Conclusion

Wildlife habitat data are critical for FRAP to meet its assessment mandate. For the 2002 Assessment, meeting this mandate required FRAP to invest time and effort into merging disparate data into a suitable product. Problems have been identified within this product, and doubtless more will emerge in the future. Obviously, this is not the optimal process for creating adequate habitat data.

California needs a comprehensive, coordinated strategy to map land cover/wildlife habitat across the State to a set of common standards. A Memorandum of Understanding for Cooperative Vegetation and Habitat Mapping and Classification has been signed by 11 State and Federal agencies *http://ceres.ca.gov/biodiversity/vegmou.html*. Progress is being made towards developing standards and implementing a more collaborative approach to mapping. The success of this effort will determine if eventually FRAP can make more efficient use of limited mapping resources and create a superior data product to support common needs.

Attachment 1. CWHR Habitat Type Classes

CWHR TYPE	CWHR NAME
ADS	Alpine-Dwarf Shrub
AGR	Agriculture
AGS	Annual Grassland
ASC	Alkali Desert Scrub
ASP	Aspen
BAR	Barren
BBR	Bitterbrush
BOP	Blue Oak-Foothill Pine
BOW	Blue Oak Woodland
CHP	Unknown Shrub Type
CON	Unknown Conifer Type
COW	Coastal Oak Woodland
CPC	Closed-Cone Pine-Cypress
CRC	Chamise-Redshank Chaparral
CRP	Cropland
CSC	Coastal Scrub
DFR	Douglas-Fir
DGR	Dryland Grain Crops
DOR	Deciduous Orchard
DRI	Desert Riparian
DRY	Dry Lake Bed
DSC	Desert Scrub
DSS	Desert Succulent Shrub
DSW	Desert Wash
EOR	Evergreen Orchard
EPN	Eastside Pine
EST	Estuarine
EUC	Eucalyptus
FEW	Freshwater Emergent Wetland
FWT	Forested Wetland
GRS	Unknown Grass Type
HDW	Hardwood
IGR	Irrigated Grain Crops
IRF	Irrigated Row and Field Crops
IRH	Irrigated Hayfield
JPN	Jeffrey Pine
JST	Joshua Tree
JUN	Juniper
KMC	Klamath Mixed Conifer
LAC	Lacustrine
LPN	Lodgepole Pine
LSG	Low Sage
MAR	Marine
MCH	Mixed Chaparral
MCN	Mixed Conifer
MCP	Montane Chaparral
MHC	Montane Hardwood-Conifer
MHW	Montane Hardwood
MRI	Montane Riparian
NWT	Nonforested Wetland
OVN	Orchard and Vineyard
PAS	Pasture
PGS	Perennial Grassland
PJN	Pinyon-Juniper
POS	Palm Oasis
PPN	Ponderosa Pine
RDW	Redwood
RFR	Red Fir
RIV	Riverine
ROG	Redwood Oldgrowth
RSP	Residential-Park
RYG	Redwood Secondgrowth
SCN	Subalpine Conifer
SEW	Saline Emergent Wetland
SGB	Sagebrush
SMC	Sierran Mixed Conifer
UAG	Urban-Agricluture
URB	Urban
VFH	Valley-Foothill Woodland
VHC	Valley-Foothill Hardwood-Conifer
VIN	Vineyard
VOW	Valley Oak Woodland
VRI	Valley Foothill Riparian
WAT	Water
WFR	White Fir
WTM	Wet Meadow
XXX	Not Determined